

Claims:

1 1. A plate making apparatus, comprising:
2 a plurality of stations (S0 to S5) arranged in order,
3 the number of said stations being at least equal to the
4 number of steps of a plate making procedure;
5 a plurality of processing apparatus corresponding
6 one by one to the steps of the plate making procedure and
7 disposed in order of the plate making procedure at said
8 stations (S0 to S5); and
9 a transport apparatus (11, 51, 61) for successively
10 transporting a plurality of printing plates (1) from one
11 to another one of said stations in order of the plate making
12 procedure.

1 2. The plate making apparatus as set forth in claim 1,
2 wherein
3 the printing plates (1) are regenerative printing
4 plates, and the plate making procedure includes a step
5 of regenerating a plate face of each printing plate (1).

1 3. The plate making apparatus as set forth in claim 2,
2 wherein,
3 as said processing apparatus, at least a pattern
4 erasing apparatus (30), a picture material applying
5 apparatus (31), a drying apparatus (32) and a pattern
6 writing apparatus (33) are provided.

1 4. The plate making apparatus as set forth in any one
2 of claims 1 to 3, wherein

3 each of the printing plates (1) is provided on an
4 outer periphery of a cylindrical carrier (2) and is
5 transported integrally with said carrier (2) by said
6 transport apparatus (11, 51, 61).

1 5. The plate making apparatus as set forth in claim 4,
2 further comprising

3 a carry-in apparatus (15) including a
4 before-processing stock section in which one or more such
5 carriers (2) before the plate making process are stocked,
6 said carry-in section (15) carrying in one of the carriers
7 from said before-processing stock section to said
8 transport apparatus.

1 6. The plate making apparatus as set forth in claim 5,
2 wherein

3 said carry-in apparatus (15) includes, as said
4 before-processing stock section, a pair of inclined rails
5 (13, 16) for supporting the opposite ends of the carrier
6 and further includes one or more stoppers (14, 17) provided
7 on said inclined rails (13, 16) and capable of selecting
8 either one of an on state in which rolling of the carrier
9 (2) is controlled and an off state in which rolling of
10 said carrier (2) is permitted, and carries in the carriers
11 (2) one by one by on/off changeover of said stoppers (14,

12 17).

1 7. The plate making apparatus as set forth in claim
2 5 or 6, wherein
3 said carry-in apparatus (15) includes a decision
4 apparatus for deciding a use situation of each printing
5 plate (1) before the printing plate (1) is carried into
6 said transport apparatus (11, 51, 61) and a selection
7 apparatus for taking out, where it is decided by said
8 decision apparatus that the printing plate is not suitable
9 for regeneration, the carrier (2) which has the rejected
10 printing plate thereon from the carry-in line.

1 8. The plate making apparatus as set forth in any one
2 of claims 4 to 7, further comprising
3 a carry-out apparatus (15) for carrying out the
4 carriers (2) after the plate making process from said
5 transport apparatus (11, 51, 61), said carry-out apparatus
6 (15) including an after-processing stock section in which
7 one or more such carried out carriers (2) are stocked.

1 9. The plate making apparatus as set forth in any one
2 of claims 4 to 8, wherein
3 said transport apparatus (11, 51, 61) includes a
4 number of pairs of chuck apparatus (20) for fitting into
5 openings (2a) at the opposite ends of each carrier (2)
6 to grasp the carrier (2) from the opposite sides and

7 centering the carrier (2) with a predetermined reference
8 axis (O2), the number being at least equal to the number
9 of said stations (S0 to S5), each of the carriers (2) being
10 carried while being grasped by said chuck apparatus (20).

1 10. The plate making apparatus as set forth in claim 9,
2 wherein

3 the carrier (2) is carried in to a mounting and
4 dismounting position for the carrier (2) by said chuck
5 apparatus (20) from a perpendicular direction to the
6 reference axis (O2), and is carried out in a perpendicular
7 direction to the reference axis (O2).

1 11. The plate making apparatus as set forth in claim
2 9 or 10, wherein

3 said stations (S0 to S5) are arranged on a circle
4 centered at a horizontal shaft (O1), and

5 said transport apparatus (11, 51, 61) revolves said
6 chuck apparatus (20) around the horizontal shaft (O1) to
7 carry the carriers (2) in order from one to another one
8 of said stations.

1 12. The plate making apparatus as set forth in claim 11,
2 wherein

3 carry-in and carry-out stations (S0 and S5) for
4 mounting each carrier (2) carried in from the outside on
5 said chuck apparatus (20) and dismounting the carrier (2)

6 after the plate making process therefor from said chuck
7 apparatus (20) to carry out the carrier (2) to the out
8 side are provided at the lowest or highest location of
9 the circle.

1 13. The plate making apparatus as set forth in claim 11,
2 wherein

3 a carry-in station (S0) for mounting each carrier
4 (2) carried in from the out side on said chuck apparatus
5 (20) is provided at the lowest or highest location of the
6 circle, and a carry-out station (S5) for dismounting the
7 carrier (2) after the plate making process therefor from
8 said chuck apparatus (20) to carry out the carrier (2)
9 to the outside is provided at a position opposing to said
10 carry-in station (S0) at the lowest or highest location
11 of the circle.

1 14. The plate making apparatus as set forth in claim
2 9 or 10, wherein

3 said stations (S0 to S5) are arranged on a line,
4 and

5 said transport apparatus (11, 51, 61) causes said
6 chuck apparatus (20) to move back and forth along the line
7 to successively carry the carriers (2) from one to another
8 one of said stations.

1 15. The plate making apparatus as set forth in claim 14,

2 wherein

3 a carry-in station (S0) for mounting each carrier
4 (2) carried in from the outside on said chuck apparatus
5 (20) is provided at one end of the line, and a carry-out
6 station (S5) for dismounting the carrier (2) after the
7 plate making process therefor from said chuck apparatus
8 (20) to carry out the carrier (2) to the outside is provided
9 at the other end of the line.

1 16. The plate making apparatus as set forth in claim 14,
2 wherein

3 carry-in and carry-out stations (S0 and S5) for
4 mounting each carrier (2) carried in from the outside on
5 said chuck apparatus (20) and dismounting the carrier (2)
6 after the plate making process therefor from said chuck
7 apparatus (20) to carry out the carrier (2) to the outside
8 are provided at one end of the line.

1 17. The plate making apparatus as set forth in any one
2 of claims 11 to 13, wherein

3 said transport apparatus (11, 51, 61) includes a
4 rotary member (11a) supported on said horizontal shaft
5 (O1) and rotatable around said horizontal shaft (O1), and
6 said chuck apparatus (20) is provided on said rotary member
7 (11a).

1 18. The plate making apparatus as set forth in any one

2 of claims 11 to 16, wherein

3 said transport apparatus (11, 51, 61) includes a
4 guide (53, 63) provided in an arrangement direction of
5 said stations (S0 to S5) and a caterpillar member (52,
6 62) provided for circulation along said guide (53, 63),
7 and said chuck apparatus (20) is provided on said
8 caterpillar member (52, 62).

1 19. The plate making apparatus as set forth in any one
2 of claims 4 to 8, wherein

3 a pair of chuck apparatus (20) for fitting into
4 openings (2a) at the opposite ends of each carrier (2)
5 to grasp the carrier (2) from the opposite sides and
6 centering the carrier (2) with a predetermined reference
7 axis (O2) are provided at each of said stations (S0 to
8 S5), and said chuck apparatus (20) mount and dismount each
9 carrier (2) to transfer the carrier (2) between the station
10 (S0 to S5) and said transport apparatus (11, 51, 61).

1 20. The plate making apparatus as set forth in any one
2 of claims 4 to 19, further comprising

3 an adjustment apparatus for adjusting the position
4 of each of said processing apparatus at each of said stations
5 (S0 to S5) in response to the diameter of the carrier (2).

1 21. The plate making apparatus as set forth in any one
2 of claims 1 to 20, further comprising

3 a clean air supplying apparatus (19, 110, 110A and
4 140) for supplying clean air to a periphery of each printing
5 plate (1) at least within a period of time after picture
6 material is applied to the printing plate (1) until the
7 picture material is dried.

1 22. The plate making apparatus as set forth in claim 21,
2 wherein

3 the clean air supplied from said clean air supplying
4 apparatus (19, 110, 110A and 140) has a cleanliness of
5 class 1000 or more according to the FED standard.

1 23. The plate making apparatus as set forth in claim
2 22 or 23, further comprising

3 a chamber (107, 134) for isolating, from the outside,
4 a space in which a series of processes in which at least
5 picture material is applied to the surface of each printing
6 plate (1) by said applying apparatus (31, 131) and then
7 the application film of the applied picture material is
8 dried by said drying apparatus (32, 132) is performed,
9 said clean air supplying apparatus (110, 140)
10 supplying clean air into the inside of said chamber (107,
11 134).

1 24. The plate making apparatus as set forth in claim 23,
2 wherein

3 the pressure in said chamber (107, 134) is set higher

4 than that outside of said chamber (107, 134).

1 25. The plate making apparatus as set forth in claim
2 23 or 24, further comprising
3 an exhaust apparatus (114) for compulsorily
4 exhausting the air in said chamber (107, 134) to the outside.

1 26. The plate making apparatus as set forth in claim 25,
2 further comprising
3 a circulation system for circulating air exhausted
4 by said exhaust apparatus (114) to said clean air supplying
5 apparatus (110) so that the air after purified is used
6 as clean air again.

1 27. The plate making apparatus as set forth in any one
2 of claims 23 to 26, further comprising:
3 a measuring instrument (121) for measuring the
4 cleanliness in said chamber (107, 134); and
5 a control apparatus (120) for controlling the air
6 volume of said clean air supplying apparatus (110, 140)
7 so that the measurement value of said measuring instrument
8 (121) may be a predetermined value.

1 28. The plate making apparatus as set forth in any one
2 of claims 23 to 26, further comprising:
3 a measuring instrument (122) for measuring the
4 difference between the pressure in said chamber (107, 134)

5 and the pressure outside of said chamber (107, 134); and
6 a control apparatus (120) for controlling the driving
7 force of a blast source of said clean air supplying apparatus
8 (110, 140) so that the measurement value of said measuring
9 instrument (121) may be a predetermined value.

1 29. The plate making apparatus as set forth in any one
2 of claims 21 to 26, further comprising:

3 a measuring instrument for measuring the wind speed
4 of the clean air supplied from said clean air supplying
5 apparatus (110, 140); and

6 a control apparatus (120) for controlling the driving
7 force of a blast source of said clean air supplying apparatus
8 (110, 140) so that the measurement value of said measuring
9 instrument may be a predetermined value.

1 30. The plate making apparatus as set forth in any one
2 of claims 21 to 29, further comprising

3 a removing apparatus for removing foreign substance
4 adhering to the surface of each printing plate before
5 picture material is applied to the printing plate by said
6 picture material applying apparatus (31, 131).

1 31. The plate making apparatus as set forth in any one
2 of claims 21 to 30, further comprising

3 a heating apparatus for heating the clean air to
4 be supplied from said clean air supplying apparatus (110,

5 140).

1 32. The plate making apparatus as set forth in any one
2 of claims 1 to 31, further comprising, as the processing
3 apparatus:

4 a development station (S4) in which a development
5 apparatus (34) for developing a pattern written on the
6 plate face of each printing plate (1);

7 a supporting member (20) disposed at said development
8 station (S4) for supporting each printing plate (1) in
9 the form of a tube; and

10 a supplying apparatus (34S, 34A to 34E) disposed
11 at said development station (S4) for supplying processing
12 liquid for development to the plate face of the printing
13 plate (1) supported by said supporting member (20).

1 33. The plate making apparatus as set forth in claim 32,
2 wherein

3 the tube is positioned on the upper side of said
4 supplying apparatus (34S, 34A to 34E) at said development
5 station (S4), and said supplying apparatus (34S, 34A to
6 34E) supplies the processing liquid for development from
7 the lower side of the tube to the plate face of the printing
8 plate (1).

1 34. The plate making apparatus as set forth in claim
2 32 or 33, wherein

3 said supplying apparatus (34S, 34A to 34E) includes
4 a processing liquid supplying member configured from one
5 or a plurality of rollers, a spray, or a slit formed from
6 one or a plurality of plate materials.

1 35. The plate making apparatus as set forth in any one
2 of claims 3 to 34, wherein

3 said pattern erasing apparatus (30) is configured
4 by arranging, around an outer periphery of the regenerative
5 printing plate (1) formed from a cylindrical face:

6 a washing agent nozzle (301) for injecting washing
7 agent toward the plate face;

8 a plate face rubbing apparatus (302) for rubbing
9 the plate face;

10 a water nozzle (303) for injecting water toward the
11 plate face; and

12 a liquid recovery apparatus (304) for recovering
13 the water on the plate face.

1 36. The plate making apparatus as set forth in any one
2 of claims 1 to 35, further comprising:

3 a detection apparatus (44) for detecting an abnormal
4 state appearing in the plate making apparatus; and

5 an outputting apparatus (45) for automatically
6 outputting a signal to the outside when an abnormal state
7 is detected by said detection apparatus (44).

1 37. The plate making apparatus as set forth in claim 36,
2 wherein

3 said outputting apparatus (45) automatically
4 outputs an abnormal state signal to a portable terminal
5 of an operator through a telephone line.

1 38. A plate making apparatus, comprising:

2 a cylindrical carrier (2) including a printing plate
3 on an outer peripheral face thereof;

4 a pair of chuck apparatus (20) for fitting in openings
5 at the opposite ends of said carrier (2) to grasp said
6 carrier (2) from the opposite sides and centering said
7 carrier (2) with a predetermined reference axis (O2); and

8 one or a plurality of processing apparatus disposed
9 in a direction toward said carrier (2) centered by said
10 chuck apparatus (20) for performing a plate making process
11 for the printing plate supported by said carrier (2);

12 said carrier (2) before processing being carried
13 into a space between the pair of chuck apparatus (20) from
14 a perpendicular direction to said reference axis (O2),
15 said carrier (2) after the plate making process being
16 carried out from the space between the pair of chuck
17 apparatus (20) to a perpendicular direction to said
18 reference axis (O2).

1 39. A management method for a regenerative printing plate
2 which is used in a state wherein the regenerative printing

3 plate is mounted on a cylindrical carrier (2), comprising
4 the steps of:

5 applying a printing plate identification number to
6 each regenerative printing plate (1) while a carrier
7 identification number is applied to each carrier (2) and
8 producing a file (42) for recording a use situation of
9 each regenerative printing plate (1) for each plate
10 identification number;

11 recording, when each regenerative printing plate
12 (1) is to be used, the printing plate identification number
13 thereof in a corresponding relationship to the carrier
14 identification number of the carrier (2) on which the
15 regenerative printing plate (1) is mounted into a table
16 (43); and

17 reading, every time each regenerative printing plate
18 (1) is used, the carrier identification number from the
19 carrier (2) to search the printing plate identification
20 number corresponding to the read carrier identification
21 number from the table (43) and recording and updating the
22 use situation of the regenerative printing plate into the
23 file (42) corresponding to the printing plate
24 identification number.

1 40. The management method for a regenerative printing
2 plate as set forth in claim 39, wherein

3 a radio reading type data storage device is attached
4 to each carrier (2) and the carrier identification number

5 is stored in said data storage device.

1 41. A management method for a regenerative printing plate,
2 comprising the steps of:

3 writing use situation data on a plate face of a
4 regenerative printing plate (1) together with a pattern;

5 reading, when the pattern of the regenerative
6 printing plate (1) is to be rewritten, the use situation
7 data of the plate face and temporarily storing the use
8 situation data into a memory (71) before regeneration;
9 and

10 updating, after the regeneration, the use situation
11 data temporarily stored in the memory together with the
12 new pattern and writing the use situation data on the plate
13 face of the regenerative printing plate (1).

1 42. A management method for a regenerative printing plate,
2 comprising the steps of:

3 applying a printing plate identification number to
4 each regenerative printing plate (1) and writing the
5 printing plate identification number on a plate face;

6 producing a file (82) for recording a use situation
7 of each regenerative printing plate (1) for each plate
8 identification number;

9 reading, when a pattern of each regenerative printing
10 plate (1) is rewritten, the plate identification number
11 of the plate face and temporarily storing the plate

12 identification number into a memory (83) before
13 regeneration and then recording and updating the use
14 situation of the regenerative printing plate into said
15 file (82) corresponding to the read out printing plate
16 identification number; and

17 writing, after the regeneration, the printing plate
18 identification number temporarily stored in said memory
19 (83) together with the new pattern on the plate face of
20 the regenerative printing plate (1).

1 43. An interstage sleeve which is applicable to a
2 cylindrical carrier (2) having a printing plate (1)
3 provided on an outer peripheral face thereof and functions,
4 when mounted on a center shaft provided in a printing machine,
5 as a printing cylinder or a blanket drum of the printing
6 machine, wherein a composite material of a microballoon
7 material and a resin material is used as a configuration
8 material.

1 44. The interstage sleeve as set forth in claim 43,
2 wherein said interstage sleeve is integrally formed from
3 the composite material.

1 45. The interstage sleeve as set forth in claim 43,
2 wherein said interstage sleeve is formed from a plurality
3 of layers, and at least one of said layers is formed from
4 the composite material.

1 46. The interstage sleeve as set forth in claim 45,
2 wherein the layer formed from the composite material forms
3 a surface or a layer in the proximity of the surface.

1 47. The interstage sleeve as set forth in any one of
2 claims 43 to 46, wherein said interstage sleeve has a
3 regenerative printing plate provided on the surface
4 thereof and is mounted on the center shaft such that said
5 interstage sleeve functions as the printing cylinder of
6 the printing machine, and said interstage sleeve functions,
7 when a regeneration process is performed for the printing
8 plate, as means for supporting the printing plate.

1 48. The interstage sleeve as set forth in claim 43,
2 wherein said interstage sleeve is formed from an outside
3 sleeve and an inside sleeve removable from each other.

1 49. The interstage sleeve as set forth in claim 48,
2 wherein at least one of said outside sleeve and said inside
3 sleeve is integrally formed from the composite material.

1 50. The interstage sleeve as set forth in claim 48,
2 wherein at least one of said outside sleeve and said inside
3 sleeve is formed from a plurality of layers, and at least
4 one of the layers is formed from the composite material.

1 51. The interstage sleeve as set forth in claim 50,

2 wherein the layer formed from the composite material forms
3 the surface of said outside sleeve or a layer in the
4 proximity of the surface of said outside sleeve.

1 52. The interstage sleeve as set forth in any one of
2 claims 48 to 51, wherein said interstage sleeve has a
3 regenerative printing plate provided on the surface
4 thereof and is mounted on the center shaft such that said
5 interstage sleeve function as a printing cylinder of the
6 printing machine, and said outside sleeve functions, when
7 a regeneration process is performed for the printing plate,
8 as means for supporting the printing plate.